

Andrews Professor Helps Find Gravitational Waves

LIGO research team makes international news

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Andrews University, along with the rest of the world, was on pins and needles this morning as we awaited the announcement from the [Laser Interferometer Gravitational-Wave Observatory](#) (LIGO) and the [National Science Foundation](#) that they had discovered a way to detect and measure gravitational waves.

However, unlike most of the rest of the world, we waited alongside one of the LIGO scientists who worked to make that a reality.

[Tiffany Summerscales](#), associate professor of [physics at Andrews University](#), is one of 1,000 researchers from various locations around the world who has been studying gravity and how to prove a theory Einstein posited a century ago. She's been working with the project since 2000 when she began her graduate research.

Summerscales explains the basis of this research, saying, "Einstein's theory of general relativity posits that mass curves space-time. When the distribution of mass changes, the curvature must also change and that change spreads outwards through space like the ripples on a pond. These ripples, also called gravitational waves, are very faint. Only the most significant events in the universe, like a supernova (an explosion that briefly outshines an entire galaxy), or massive objects are capable of producing gravitational waves of measureable strength."

[The New York Times](#) proclaims that these physicists—Summerscales and her LIGO colleagues—"can now count themselves as astronomers" as they report that they have heard and recorded the sound of two black holes colliding a billion light-years away. "A fleeting chirp that fulfilled the last prophecy of Einstein's general theory of relativity," says NYT reporter Dennis Overbye.

[The BBC](#) calls this work "a stunning discovery," and quotes Sheila Rowan, Glasgow University professor and a lead UK researcher involved with the project: "It's amazing that when we first turned on our detectors, the Universe was ready and waiting to say 'hello.'"

“The announcement is the climax of a century of speculation, 50 years of trial and error, and 25 years perfecting a set of instruments so sensitive they could identify a distortion in space-time a thousandth the diameter of one atomic nucleus across a 4km strip of laser beam and mirror,” says Tim Radford in his story for [The Guardian](#).

In a statement made by David Reitze, executive director of LIGO, today at a press conference in Washington, D.C., we learn that “the gravitational waves—ripples in space-time—were created by the merging of two black holes. One black hole had the mass of 29 suns; the other was the equivalent of 36 suns. Each was perhaps 50 kilometers (30 miles) in diameter,” [CNN reported](#).

CNN reporter Todd Leopold shared in his article that the gravitational waves stretched and compressed space around Earth “like Jell-O” (quoting Reitze). However, these “waves are so small it takes a detector like LIGO, capable of measuring distortions one-thousandth the size of a proton, to observe them.”

These waves were observed on September 14, 2015.

“Scientists heard the sound of the black holes colliding as a ‘chirp’ lasting one-fifth of a second,” reports CNN. “Though gravitational waves aren’t sound waves, the increase in frequency the collision exhibited in its last milliseconds—when the black holes were mere kilometers apart and growing closer—is a frequency we can hear, said Deirdre Shoemaker, a Georgia Tech physicist who works on LIGO.”

- Read the [full story of Summerscales’ involvement in this amazing groundbreaking LIGO project](#) in an original story published on Andrews.edu in November 2015
- For details on LIGO, visit [ligo.org](#).
- Learn below about the sound of two black holes colliding, and what gravitational waves are in layman’s terms

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